James Fitzgiobon

**MOVABLE BARRIER ... CAPABILITY. TO E S O D S ... D E J ... D E J

Sheet 1 of 25 Serial No. 10/083,905

Docket No. 72928/5569

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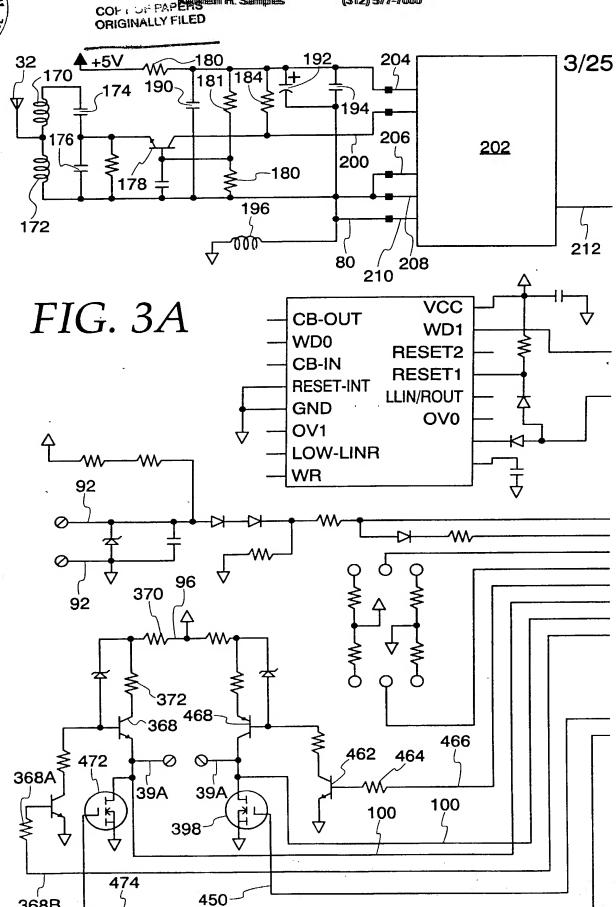
James Fitzgiopon MOVABLE BARRIER ... CAPABILITY 1 1 2 3 9 0 5 ... С 5 1 2 0 2 2 of 25 Serial No. 10/083,905

Docket No. 72928/5569 Sheet 2 of 25 AUG 1 2 2002 (312) 577-7000 Kenneth H. Samples 2/25 **TACHOMETER** 50 COPY OF PAPERS ORIGINALLY FILED 132 34 RELAY LOGIC 104 POWER SUPPLY Z2 92 92 102 NON-NOLATILE DETECTOR 8 OBSTACLE MEMORY SENSOR 120 TEMPERATURE **MICROCONTROLLER** 82 98 9 SWITCH BIASING MODULE 96 RECEIVER 80 39A MODULE 없

368B

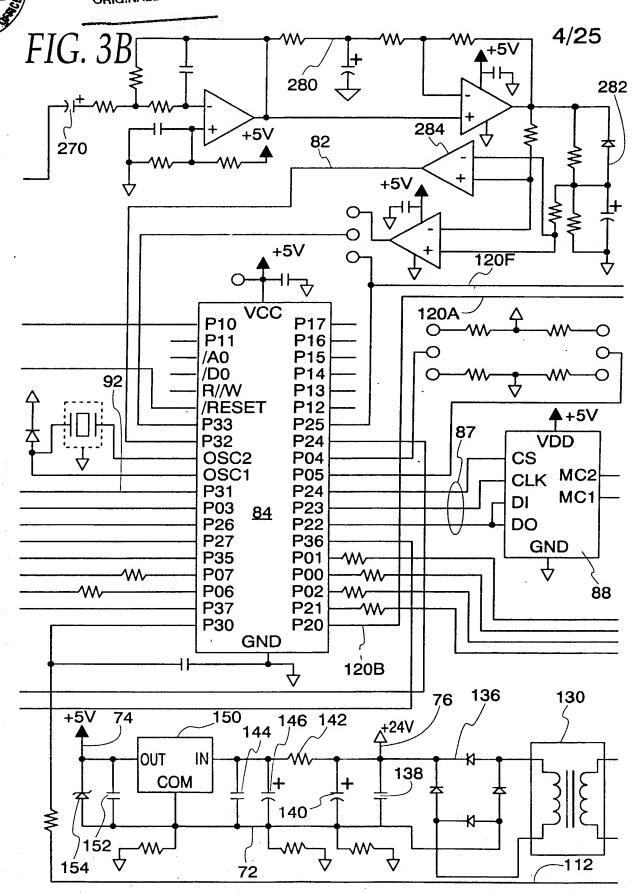
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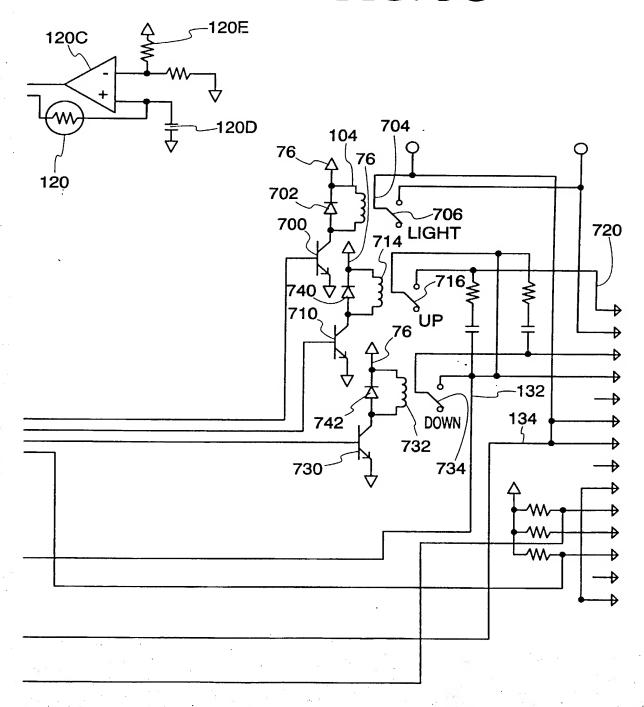
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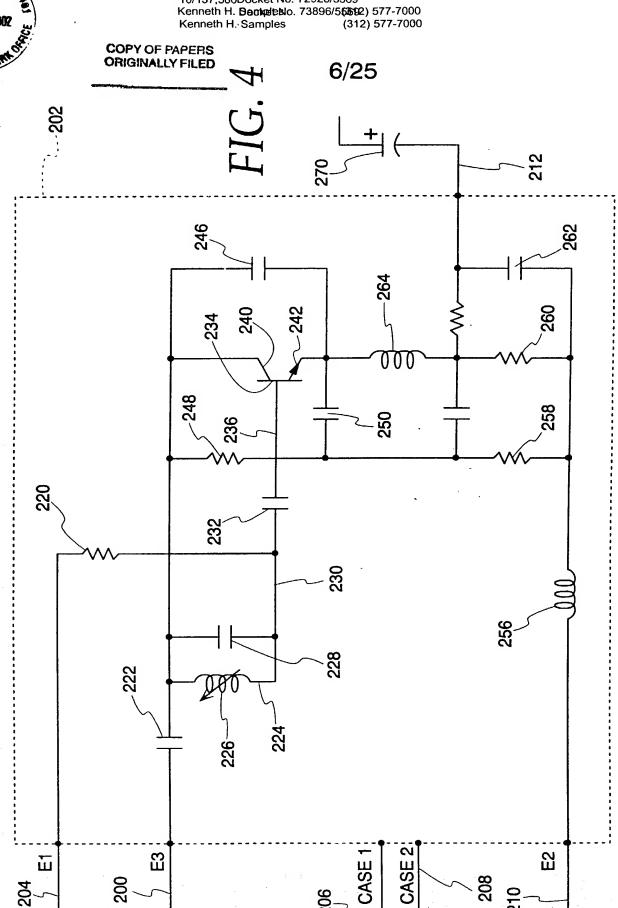
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COPY OF PAPERS ORIGINALLY FILED FIG. 3A FIG. 3B FIG. 3C

FIG. 3C

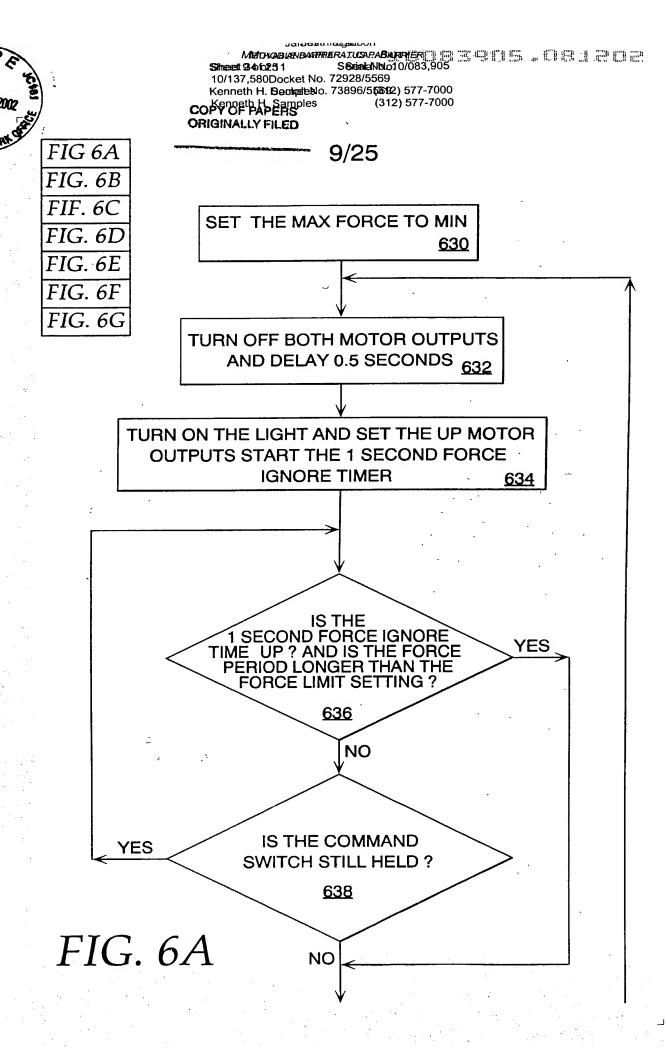


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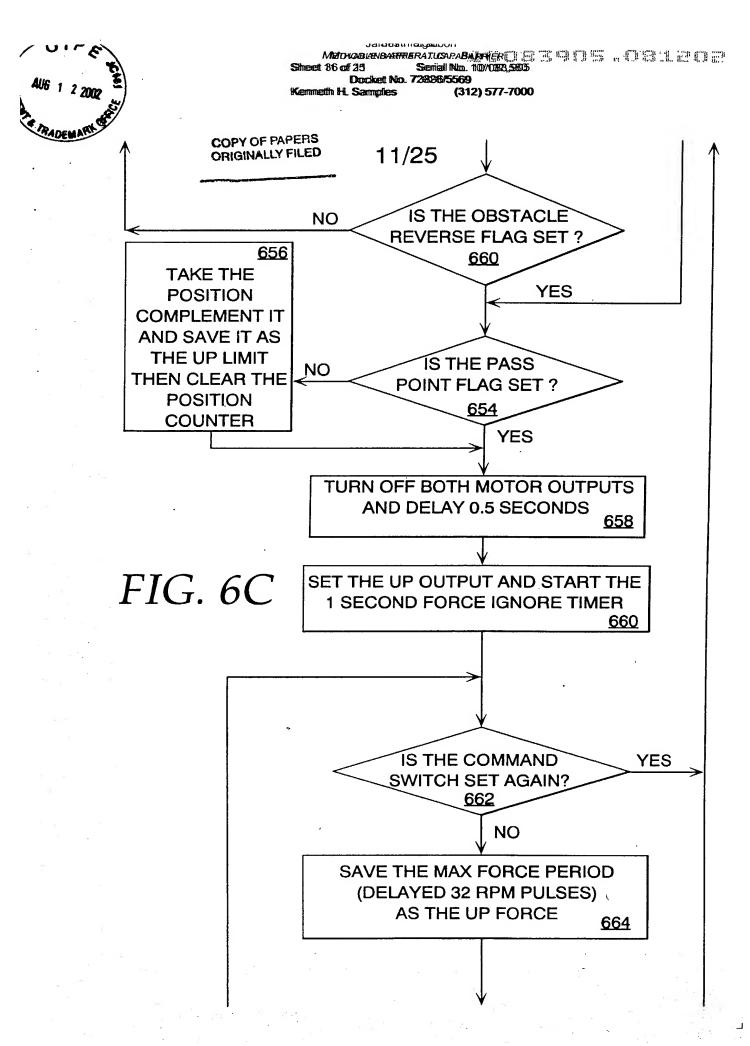


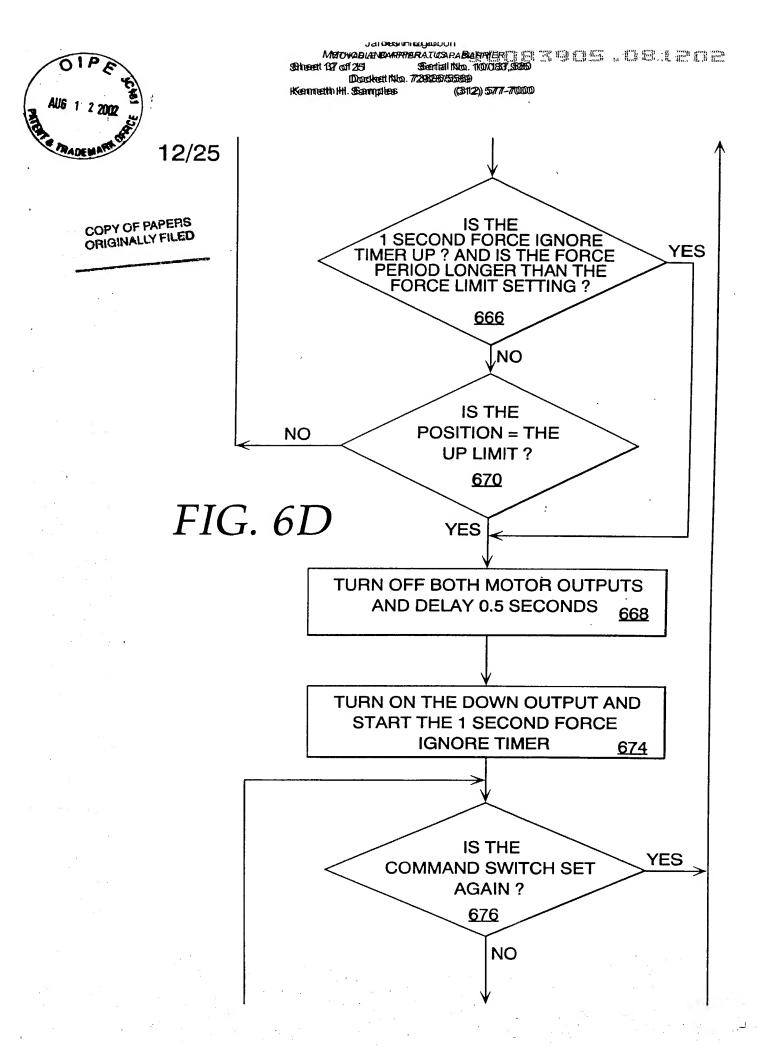
しなごはまだこれにごとまだしてこ MODOGO WID WATER TO BE PROPERTIES AND THE PROPERTIE Stheet 826251 10/137,580Docket No. 72928/5569 Kenneth H. Bornwicklo. 73896/56692) 577-7000 AUG 1 2 2002 (312) 577-7000 Kenneth H. Samples 7/25 COPY OF PAPERS ORIGINALLY FILED POWER ON RESET **CLEAR ALL MEMORY AND** TEST CHECKSUM OF ROM FIG 5A IS THE CHECKSUM AND THE NO MEMORY CORRECT? FIG 5A 302 YES FIG 5B WHAT WAS THE LAST NONVOL SAVE LAST STATE DOWN LIMIT LAST STATE UP LIMIT OF THE STATE OF THE **OPERATOR?** <u>304</u> LAST STATE SOMEWHERE IN THE MIDDLE SET THE POSITION SET THE POSITION SET THE POSITION AS THE DOWN LIMIT AS OUTSIDE OF NORMAL AS THE UP LIMIT **VALUE AND SET THE RANGE 6 INCHES BELOW** VALUE AND SET THE WINDOW FLAG. SET THE SECONDARY UP LIMIT. WINDOW FLAG. THE OPERATION STATE SET THE OPERATION SET THE OPERATION **AS DOWN LIMIT** STATE AS STOPPED STATE AS UP LIMIT 306 310 READ THE MOTOR TEMPERATURE FROM THE NONVOL. READ THE PC BOARD TEMPERATURE FROM THE CIRCUIT AND IF IT IS GREATER THAN THE TEMPERATURE READ FROM THE NONVOL SET THE PCB TEMPERATURE AS THE MOTOR TEMPERATURE. 312

S& calabo 10/083,905 Sheet 8310251 10/137,580Docket No. 72928/5569 Kenneth H. Sankstello. 73896/55692) 577-7000 COPY OF L. Kenneth H. Samples (312) 577-7000 ORIGINALLY FILED 8/25 DO RADIO FUNCTIONS 314 WAS THE LEARN SWITCH NO **ACTIVATED WITHIN THE** LAST 30 SECONDS? 316 YES IS THE COMMAND NO SWITCH DEBOUNCE UP? <u>318</u> FIG. 5B YES DO A LEARN LIMITS CYCLE 320 RPM INTERRUPT TIMER INTERRUPT **EVERYFALLING EDGE EVERY 0.5 ms** FROM THE TACH 324 322 **OBSTACLE DETECTOR CLEAR THE** TIMER INTERRUPT INTERRUPT EVERY **OBSTACLE** IF WALL SWITCH 10MS FROM THE TIMER THEN 0.3 ms **PROTECTOR** RETURN IF RS232 THEN 326 WHEN THE 328 0.208ms **PHOTOBEAM** IS NOT BROKEN



Sheet \$5 of 25 SSINDENTO/083,905 10/137,580Docket No. 72928/5569 Kenneth H. Sachetello. 73896/55892) 577-7000 (312) 577-7000 Kenneth H. Samples 10/25 TURN OFF BOTH MOTOR OUTPUTS AND DELAY 0.5 COPY OF PAPERS ORIGINALLY FILED SECONDS AND CLEAR THE POSITION COUNTER 640 TURN ON THE DOWN OUTPUT AND START THE 1 SECOND FORCE IGNORE TIMER <u>641</u> **INCREASE** YES IS THE COMMAND THE FORCE SWITCH SET AGAIN ? LIMIT SETTING 642 644 NO IS THE ONE SECOND FORCE IGNORE TIMER DONE THEN SAVE THE MAX FORCE PERIOD (DELAYED 32 RPM PULSES) AS THE DOWN FORCE <u>646</u> TAKE THE POSITION COMPLEMENT IT AND ARE WE AT SAVE IT AS THE UP THE PASSPOINT? LIMIT THEN CLEAR 648 THE POSITION COUNTER. SET NO **PASS POINT** <u>650</u> IS THE 1 SECOND FORCE IGNORE YES TIMER UP ? AND IS THE FORCE PERIOD LONGER THAN THE FIG. 6B FORCE LIMIT SETTING? <u>652</u> NO





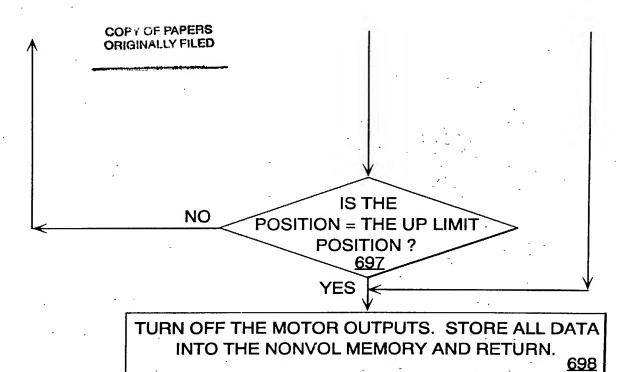
שמוווכט דוובטוטטטוו MOVABLE BARRIER ... CAPABILITY TIE 3 TO STORY OF STREET OF STREET AND STREET OF STREET Sheet 13 of 25 Docket No. 72928/5569 (312) 577-7000 Kenneth H. Samples 13/25 COPY OF PAPERS IF THE POSTION COUNTER IS AT A ORIGINALLY FILED SECTIONAL BARRIER AND THE ONE SECOND FORCE IGNORE TIMER IS UP SAVE THE MAX FORCE (DELAYED 32 RPM PULSES) FROM START OF THE FIG. 6E BARRIER INTO THE DOWN FORCE ARRAY IS THE YES **OBSTASCLE REVERSE FLAG** SET? <u>680</u> NO IS THE 1 SECOND FORCE IGNORE NO TIMER UP ? AND IS THE FORCE PERIOD LONGER THAN THE FORCE LIMIT SETTING? **682** YES IS THE NO PASS POINT FLAG SET? 684 YES SAVE THE POSTION AS THE DOWN LIMIT POSTION <u>686</u>

שמווופט רוובעוטטטוו MOVABLE BARRIER ... CAPABILITY! Sheet 14 of 25 Serial No. 10/083,905 Docket No. 72928/5569 Kenneth H. Samples (312) 577-7000 . 14/25 COPY OF PAPERS ORIGINALLY FILED TURN OFF BOTH MOTOR OUTPUTS AND DELAY 0.5 SECONDS 688 FIG. 6F TURN ON THE UP OUTPUT AND START THE 1 SECOND FORCE IGNORE TIMER 690 IS THE COMMAND SWITCH SET AGAIN? 692 NO IF THE POSITION COUNTER IS AT A SECTIONAL BARRIER AND THE ONE SECOND FORCE IGNORE TIMER IS UP <u>694</u> SAVE THE MAX FORCE (DELAYED 32 RPM PULSES) FROM START OF THE BARRIER INTO THE UP FORCE ARRAY IS THE 1 SECOND FORCE IGNORE YES TIMER UP ? AND IS THE FORCE PERIOD LONGER THAN THE FORCE LIMIT SETTING? 696 NO

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FIG. 6G

שמוווכט דוגציוטטטוו Sheet 16 of 25 Serial No. 10/083,905 Docket No. 72928/5569 AUG 1 2 2002 (312) 577-7000 Kenneth H. Samples 16/25 DO MOTOR IS THE 2MS YES **OPERATION** TIMER UP? COPY OF PAPERS <u>576</u> ORIGINALLY FILED 550 NO -IS THE 500MS NO TIMER UP? 552 FIG. 7A YES IS THE MOTOR NO POWER ON? 554 YES IS THE MOTOR YES STALLED? **556** NO MOTOR TEMPERATURE = MOTOR TEMPERATURE -**MOTOR TEMPERATURE = MOTOR TEMPERATURE =** ((MOTOR TEMPERATURE -PCB **MOTOR TEMPERATURE + MOTOR TEMPERATURE +** TEMPERATURE)* THERMAL STALLED ADDER **RUNNING ADDER** DECAY FRACTION) 562 **560** HAS THE 15 MIN TIMER NO TIMED OUT? **564** YES STORE THE MOTOR TEMPERATURE INTO NONVOL **566**

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FIG. 7B

FIG. 7B

FIG. 7A

MOVABLE BARRIER ... CAPABILITY OF ESCORE ... CAPABILITY OF ESCORE Sheet 18 of 25 Serial No. 10/083,905 Docket No. 72928/5569 Kenneth H. Samples (312) 577-7000 FIG. 8A 18/25 WHAT IS THE COPY OF PAPERS OFIGINALLY FILED PRESENT OPERATION STATE? AUTOREVERSE **UP TRAVEL** 580 . AT DOWN STOPPED IN DELAY LIMIT MID TRAVEL AT UP LIMIT DOWN TRAVEL IF THERE IS A COMMAND A COMMAND A COMMAND A COMMAND A COMMAND A COMMAND FROM THE FROM THE FROM THE FROM THE FROM THE FROM THE **RADIO RADIO** RADIO **RADIO** RADIO **RADIO** OR WALL OR WALL OR WALL OR WALL OR WALL OR WALL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL SET THE SET THE AND THE MOTOR SET THE AND THE MOTOR AND THE MOTOR STATE STATE STATE AS **TEMPERATURE TEMPERATURE TEMPERATURE** AS STOPPED AS STOPPED IS BELOW THE AUTOREVERSE IS BELOW THE IS BELOW THE IN MID TRAVEL IN MID TRAVEL DOWN TRAVEL AND CLEAR THE **UP TRAVEL** DOWN TRAVEL 582 588 THRESHOLD **AUTOREVERSE** THRESHOLD THRESHOLD THEN SET THE TIMER : THEN SET THE THEN SET THE 600 STATE AS STATE AS STATE AS IF THE FORCE DOWN TRAVEL **UP TRAVEL** DOWN TRAVEL IF THE 0.5 IF NOT DONE IF NOT DONE **PERIOD IS** IF THE FORCE 614 SECOND **DUE TO DUE TO** LONGER **PERIOD IS** TIMER IS **TEMPERATURE** TEMPERATURE THAN THE LONGER **UP SET THE** OUTPUT OUTPUT **UP ARRAY** THAN THE STATE AS DIAGNOSTIC DIAGNOSTIC **VALUE FOR DOWN ARRAY** UP TRAVEL. CODE CODE THIS POSITION **VALUE FOR** <u>596</u> <u>610</u> SET THE STATE THIS POSITION 584 AS STOPPED SET THE STATE IN MID TRAVEL AS 590 **AUTOREVERSE** STARTING THE **AUTOREVERSE** TIMER RETURN **RETURN** RETURN 602 RETURN 616 <u>586</u> **598** 612

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James Fitzgibbon MOVABLE BARRIER ... CAPABILITY OF 3 JUS .. CESS.ECE f 25 Serial No. 10/083,905 Docket No. 72928/5569 Sheet 19 of 25 (312) 577-7000 Kenneth H. Samples 19/25 IF THE IF THE COPY OF PAPERS POSITION = POSITION = ORIGINALLY FILED THE DOWN **UP LIMIT OR** LIMIT POSITION = **POSITION AND SECONDARY** THE PASS **UP LIMIT** POINT IS SEEN **POSITION SET THE** THEN SET THE STATE STATE AS UP LIMIT AS DOWN LIMIT 604 592 IF THE POSITION = THE DOWN RETURN LIMIT **POSITION AND** 594 THE PASS POINT IS NOT SEEN SET THE STATE AS FIG. 8B AUTOREVERSE AND START THE **AUTOREVERSE** TIMER 606 FIG. 8A **RETURN** FIG. 8B 608

James Fitzgibbon Sheet 20 of 25 Serial No. 10/083,905 Docket No. 72928/5569 Kenneth H. Samples (312) 577-7000 20/25 MEASURE PERIOD FROM LAST PULSE TO THIS PULSE AND SAVE AS FORCE PERIOD 800 COPY OF PAPERS ORIGINALLY FILED 孑れVEL DOWN TRAVEL UP DOWN LIMIT WHAT IS **UP LIMIT AUTOREVERSE** STOPPED IN MID TRAVEL THE OPERATOR DOING? <u>802</u> INCREMENT THE DECREMENT THE **POSITION COUNTER POSITION COUNTER** 804 806 HAS THE IS THE YES YES MAX PATTERN TIME PATTERN TESTING **EXPIRED?** FLAG SET? 808 **810** SET THE NO **OBSTACLE** NÒ **REVERSE FLAG AND** IS THE RETURN 820 YES OBSTACLE FLAG SET? HAS THE 812 BLOCKAGE OPEN PATTERN BEEN SEEN WITH THE NO NO CORRECT TIMINGS ? **SET FLAG** 822 **RETURN** FOR TESTING RETURN 824 YES **PATTERN** 814 AND RETURN IS THE 816 NO WINDOW FLAG SET? **826** YES FIG. 9A

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MOVABLE BARRIER ... CAPABILITY CIE 3 CIE ... CIE LE Sheet 21 of 25 Serial No. 10/083,905 Docket No. 72928/5569 Kenneth H. Samples (312) 577-7000 21/25 COPY OF PAPERS ORIGINALLY FILED SET THE **OBSTACLE** IS THE POSITION WITHIN THE **REVERSE FLAG** NO WINDOW? AND RETURN 828 830 YES CLEAR THE POSITION COUNTER, SET THE WINDOW FLAG AND FLAG PASS POINT FOUND THEN RETURN

FIG. 9B

FIG. 9A

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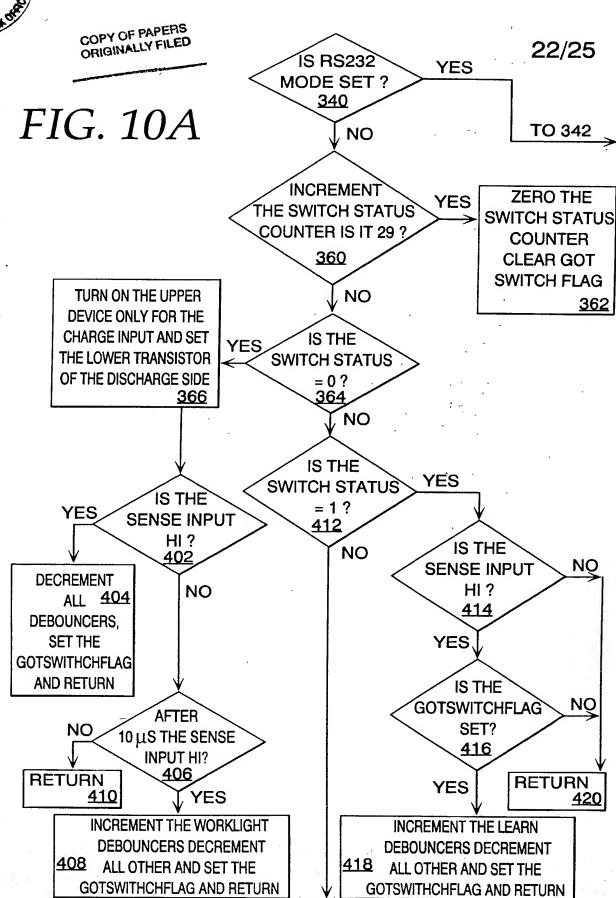
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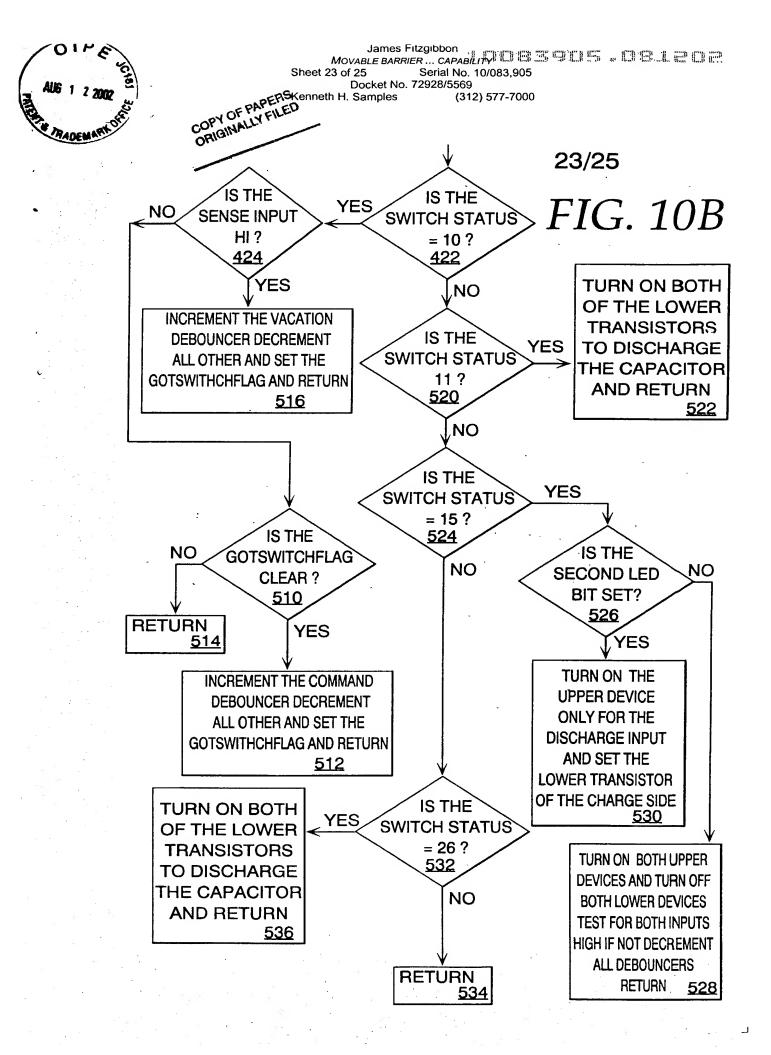
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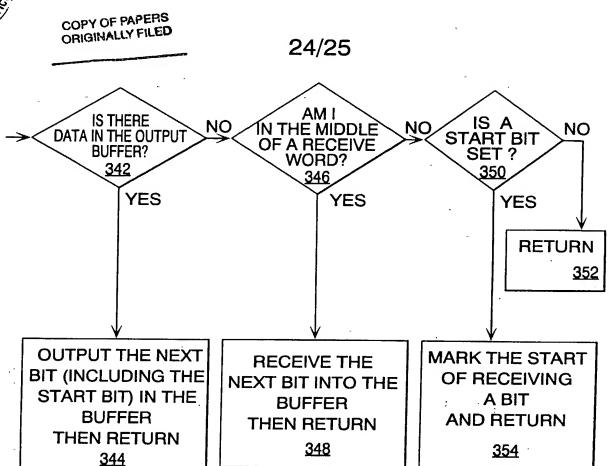


FIG. 10C

FIG.	10A	FIG.	10C

FIG. 10B

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